



Evaluating rural coping and adaptation measures in the context of water-related risks in the VMD

Presentation PhD thesis
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WISDOM PhD Scientific Seminar June 12th 2013

United Nations University – Institute for Environment and Human Security (UNU-EHS)
Geographisches Institut der Universität Bonn

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WISDOM I
Vulnerability Assessment

Vulnerability

Exposure

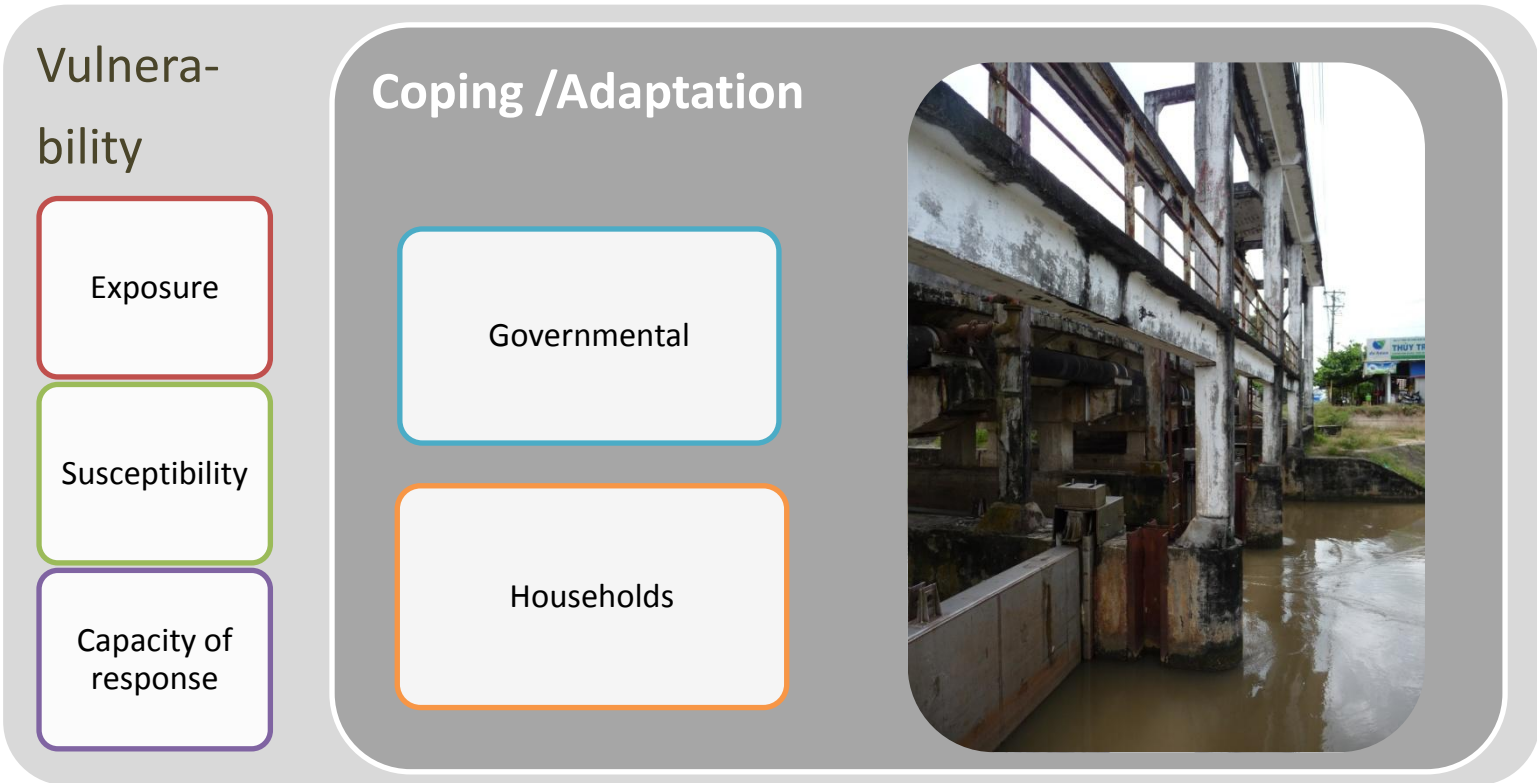
Susceptibility

Capacity of response



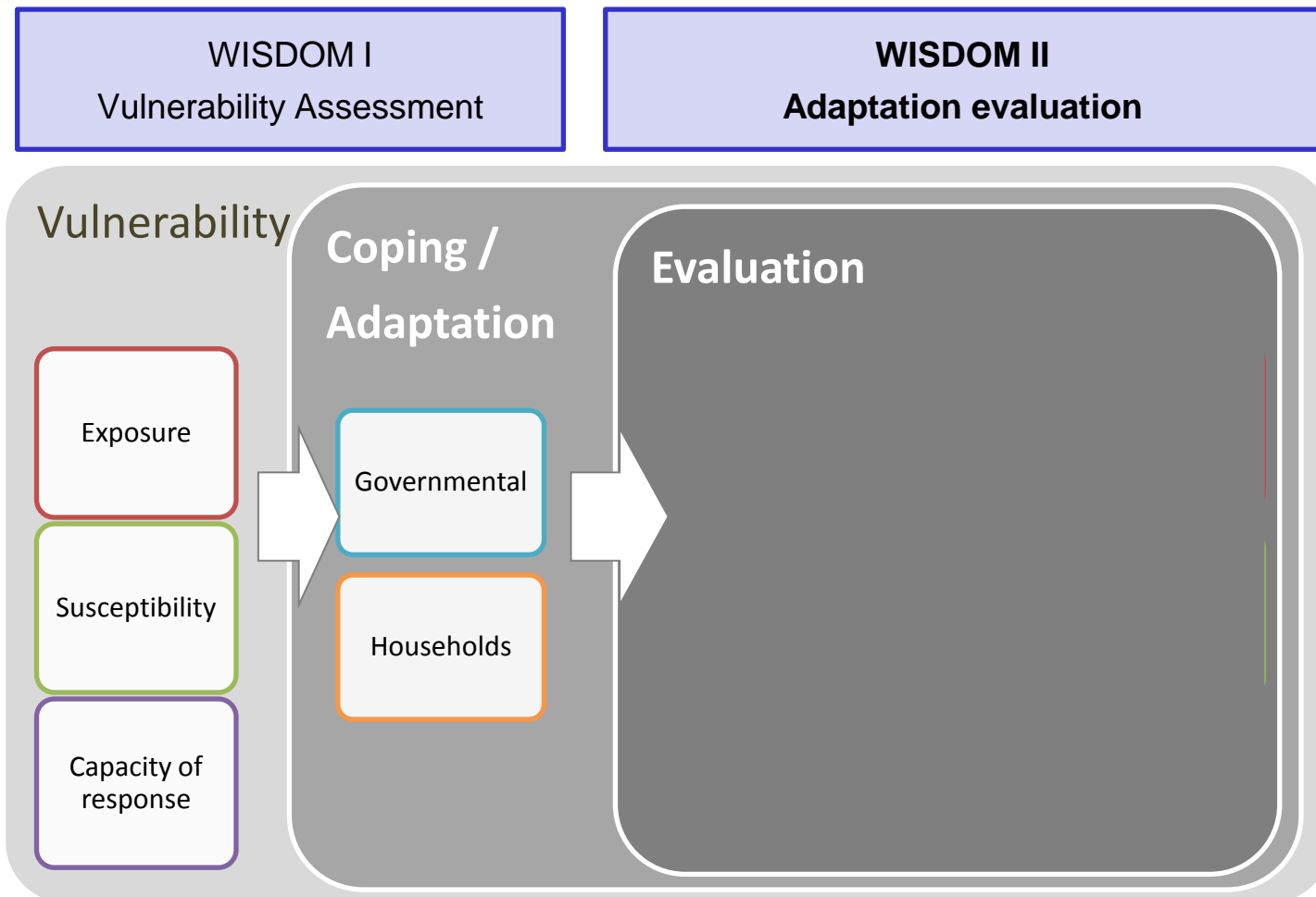
WISDOM I
Vulnerability Assessment

WISDOM II
Adaptation evaluation



WISDOM

Water-Related Information System for the Sustainable Development of the Mekong Delta





- Legend
- Research District
 - Research Provinces TV
 - Rivernetwork
 - Cities in the VMD
 - Mekong Delta Provinces
 - Main Rivers

Scale / Reference System

Reference coordinate system: Geographic coord. system
 Projection: UTM Zone 48 N
 Spheroid: WGS 84
 Datum: WGS 84



1:20.000.000

Interpretation

Research sites in the Vietnamese Mekong Delta for the PhD project of Maria Schrab UNU-researcher within the WISDOM project

Thesis title: "Evaluating coping and adaptation processes in the light of change - An analysis of formal and informal strategies in the context of flooding and salinisation in rural areas of the VMD"

Data Sources

LANDSAT-7 ETM+ data from 2001/12/11 © USGS 2001
 Administrative boundaries and river network © Sub-National Institute for Agricultural Planning and Projection (Sub-NIAPP), 2000

Map Info

Author: Maria Schrab (PhD researcher UNU)
 Map created in February 2012

Evaluation



Research questions

- ◆ RQ1: How vulnerable are households in the context of water-related risks and how is this vulnerability interlinked with coping and adaptation processes on site?
- ◆ RQ2: How are decisions made and strategies evaluated?
- ◆ RQ3: Which coping and adaptation strategies are most promising for different stakeholders and timescales?

Selected evaluation approaches

Analytical components of the research framework		Input-Output-Outcome	Behavioural change	Process-based	CBA	Risk assessm.	Present evaluation
<i>Risk context</i>	Hazard						
	Vulnerability						
<i>Decision-making</i>	Perception hazard & vulnerability						
	Goals & preferences						
<i>Implementation</i>	Inputs						
	Process						
	Outputs						
<i>Outcomes & Impacts</i>	Outcomes						
	Impacts on vulnerability						

Legend

- Analytical components concep. framework
- Analytical sub-components
- Evaluation approaches
- Components included in eval. approach

Source:
author, evaluation classification mainly based on Silva-Villanueva (2011)



UBND TỈNH TRÀ VINH CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
 SỞ NÔNG NGHIỆP VÀ PTNT Độc lập - Tự do - Hạnh phúc

Số: 34 /BC-SNN Trà Vinh, ngày 20 tháng 02 năm 2011

BÁO CÁO

Tổng kết công tác năm 2010 và phương hướng
 nhiệm vụ năm 2011

Phần 1

ĐÁNH GIÁ TÌNH HÌNH THỰC HIỆN NHIỆM VỤ NĂM 2010

Triển khai thực hiện các chỉ tiêu kế hoạch năm 2010 có những thuận lợi như: cây trồng, vật nuôi và thủy sản tiếp tục phát triển, dịch bệnh trên đàn vật nuôi được kiểm soát, sâu bệnh trên lúa gây hại không đáng kể; năng suất, sản lượng lúa tăng so cùng kỳ; diện tích nuôi thủy sản vùng mặn - lợ tiếp tục được mở rộng, sản lượng nuôi trồng, khai thác đều tăng so cùng kỳ; năng lực sản xuất giống vật nuôi, cây trồng được quan tâm đầu tư; các công trình thủy lợi hoàn thành đưa vào sử dụng phát huy hiệu quả đã góp phần phục vụ tốt cho sản xuất nông nghiệp.

In-depth interviews

Household survey

Methods

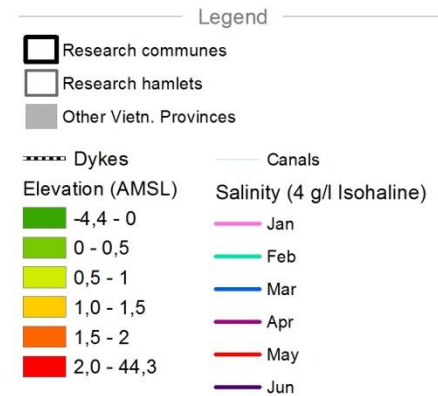
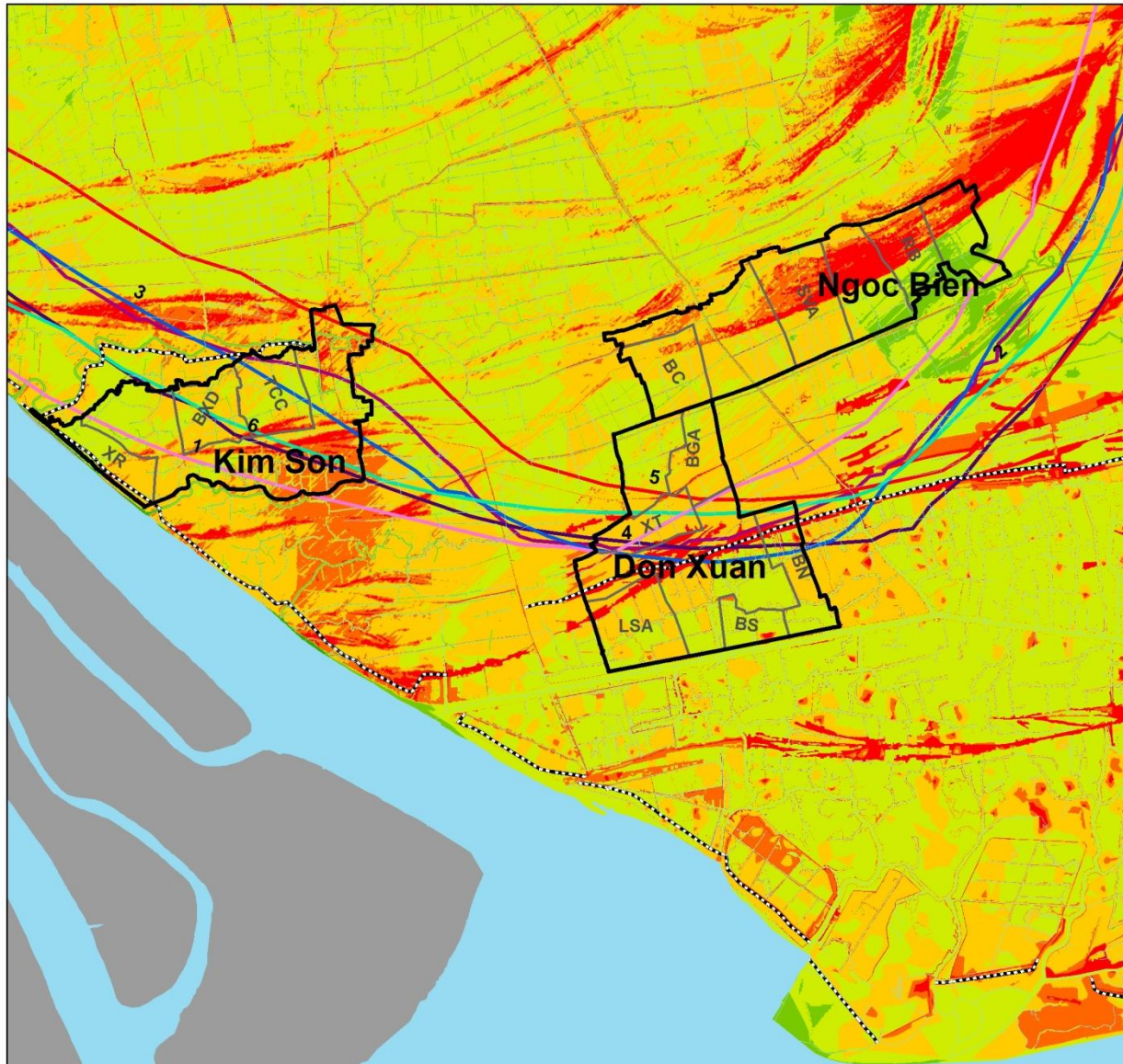
Participatory group discussions

Literature/Report collection and review



Household level

Risk context



Scale / Reference System

Reference coordinate system:
 Projection: UTM Zone 48 N
 Spheroid: Transverse Mercator_WGS 84
 Date: March 2013

0 15 30 60 90 120
 Kilometers

Source

Tra Vinh Base Map; Elevation map, Administrative Boundaries; Salinity; Canals (based on GIS data from DONRE Tra Vinh 2005)

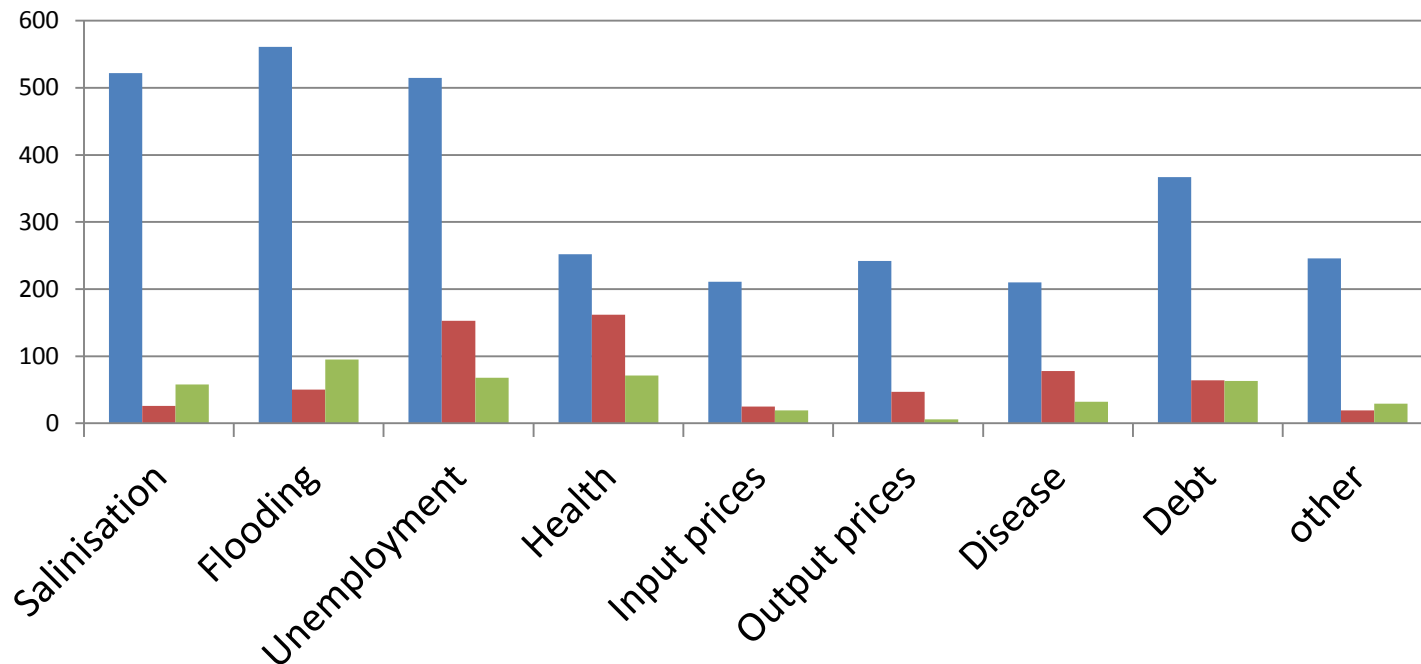
Hamlet borders (digitalisation based on participatory hamlet risk maps and communal reports for Don Xuan)

Decision-making

Level	Commune	Production system	Rank salinity risk	(most severe year)	Rank flood risk	(most severe year)
Commune (group discussions)	Ngoc Bien	Rice	1	(2010/2011)	-	-
	Don Xuan	Rice	1	(2010/2011)	-	-
	Kim Son	Aquaculture	-	-	1	(2003)
		Sugarcane	3	(2010/2011)	3	(2010/2011)
Level	Institution		Rank salinity risk	(most severe year)	Rank flood risk	(most severe year)
District (interviews)	Farmer's Association		1	(2010/2011)	4	(general)
	DARD		1	(2010/2011)	2	
Province (interviews)	DARD		1	(2010/2011)	2	

Source: Focus group discussions and interviews with authorities 2012, M. Schwab

total amount of mentionings (for 18 selected strategies and n=313)



What was the main reason for applying this strategy?

■ Reaction to past events

Source: Household survey 2012 (n=313), M. Schwab

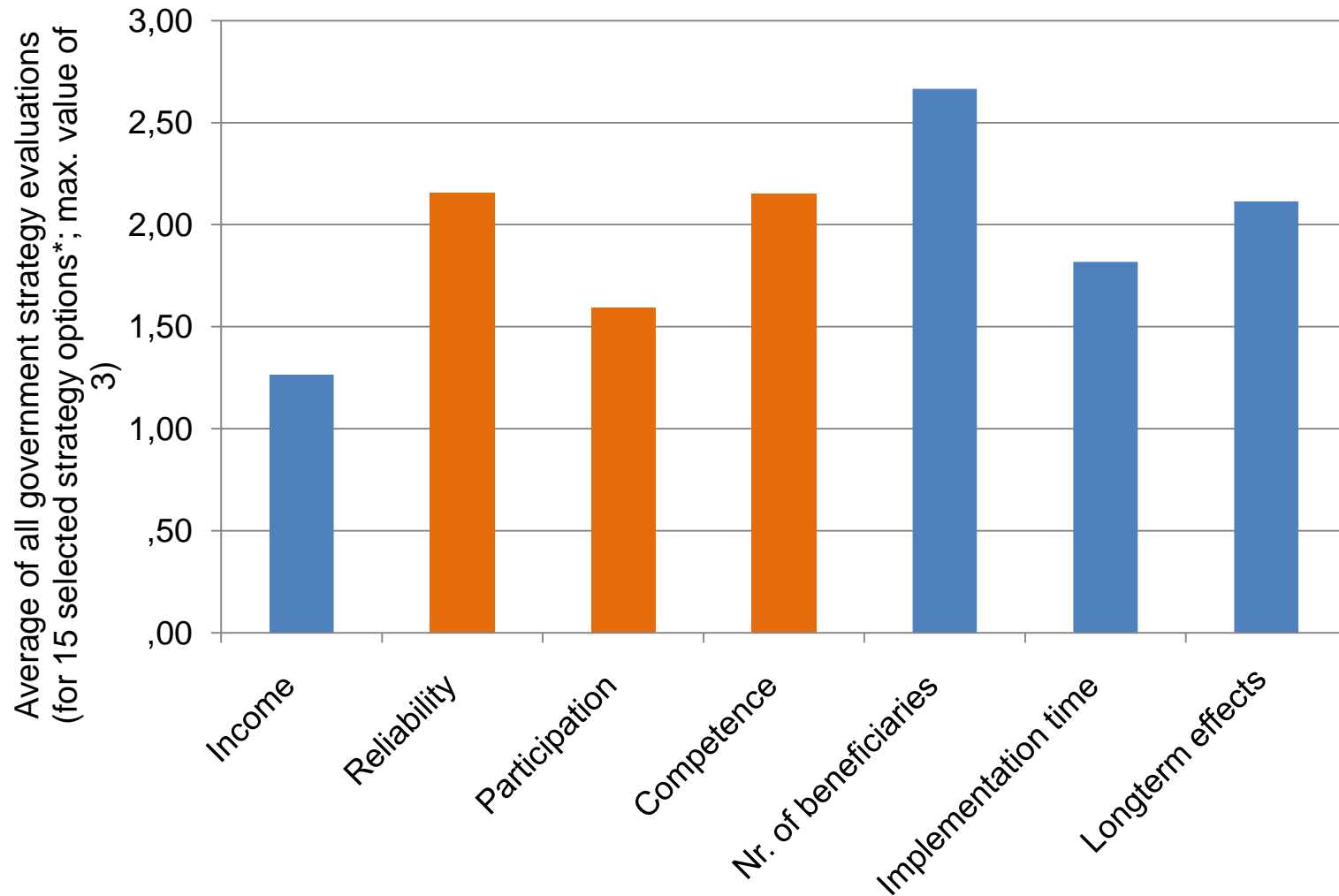
- Households showed little awareness and know-how when it comes to:
 - Susceptibility of crops
 - Quality of the embankment
- Little trust in the own know-how and capabilities
 - Both government and households see lack of formal education as a major barrier, especially for Khmer people
 - People often think that they don't have the know-how to change the product
- Awareness and perception of only few adaptation options
 - Particularly in areas where households have little risk specific experience (salinity intrusion in rice producing areas)

Implementation and Impacts

- Many coping strategies applied which were meant to provide compensatory financial resources. These reduced capacity of response in the long-run, though. E.g.:
 - Selling productive assets
 - Buying more food and inputs on credit / taking a loan
- Several strategies changed susceptibility of households
 - Seasonal migration increases number of income sources
 - WS-rice production increases susceptibility to salinity intrusion substantially
- Only few exposure reducing strategies applied
 - Selling land

- Few coping options applied
 - Compensation payments
 - Early warning
- More adaptation with a focus on and preference for exposure reducing activities
 - Building a dike
 - Dredging the canals
- Little support to increase agency, awareness and the belief in the own capacities
 - Many training classes but salinity and flooding play merely a minor role

Scoring of most important governmental strategies according to selected criteria



*only hh who were affected by a policy measure evaluated the respective strategy.

Source: Household survey ; M. Schwab 2012

Research area	All communes		Kim Son commune		Don Xuan commune		Ngoc Bien commune		Tra Cu district		Tra Vinh	
Prod. type focus	(mean value)		Sugar cane		Aquaculture		Rice		Rice/ Sugarcane		Rice	
Stakeholder group	Hh	Gov.	Hh	Gov.	Hh	Gov.	Hh	Gov.	DARD	FA*	DARD* *	
Evaluation criteria	<i>Scoring of relevant criteria for decision-making (total of 25 points)</i>										<i>Ranking</i>	
Impact on Hh-Income/ productivity	8,3	6,2	9	8,8	11	4	5	7	7,5	6	2	
Farmer Implement.	2,3	2,2	7	2,5	0	3	0	1	1,3	8		
Food security	0	0	0	0	0	0	0	2	0			
Environment	0	2,1	0	1,3	0	2	0	3	1,3	7		
CC-proof	0	0,4	0	1,3	0	0	0	0	0			
Nr of beneficiaries	4,0	4,8	6	7,5	3	3	3	4	3,8	5	3	
Costs	2,0	2,0	0	0	6	4	0	2	5	2	1	
Accountability	1,3	0	1	0	0	0	3	0	0	1		
Participation	1,0	3,9	0	3,8	0	6	3	2	1,3	3		
Competence	1,7	0,3	0	0,0	0	0	5	1	0			
Implentation time	4,3	2,0	2	0	5	3	6	3	3,8	4		
Total of given points	25	25	25	25***	25	25	25	25	25***	<i>Rank</i>	<i>Rank</i>	
Nr of participants	61	31	13	10	33	11	15	10	1	2	2	

* FA= Farmers' Association; ** Irrigation Department of DARD Tra Vinh; *** In the discussion 100 points instead of 25 were distributed which is why 25 points represents 100/4 points

Source: Group discussions with commune authorities and households; M. Schwab 2012

Concluding remarks

- Long-term oriented planning and a system of continuous quantitative data collection on local level exists which also addresses the context of water-related risks but:
 - More transparency in terms of data sources and collection
 - More integrative and flexible scenarios / planning needed
- Risk perception is high but there is low trust in the own capabilities and little awareness of new adaptation options
 - Strengthen the capability of households to take situation-specific and more sustainable decisions
 - Integrate more risk-specific awareness raising and capacity building in training classes
 - Promote more risk-specific strategies

- Stakeholder goals and the consequences of applied measures are often divergent leading to lower acceptance of measures and potential conflicts
 - Evaluations should not only consider target group but also stakeholders on other spatial, social and temporal scales
 - More stakeholder involvement and consideration of the opinions in public decision-making
 - Interest in and awareness of stakeholder preferences can facilitate dialogue and mutual understanding

- Evaluations of projects such as CBA or EIA exist but:
 - Integration of less-regarded criteria and stakeholder specific evaluation can be beneficial in many cases
 - Important to know the range of options (quality of one strategy has to be seen against the background of potential alternatives)


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- Grothmann, T.; Patt, A. (2005): Adaptive capacity and human cognition: the process of individual adaptation to climate change. In *Global Environmental Change Part A* 15 (3): 199-213.
- HMI Tra Vinh (2012a): Tóm tắt tình hình khí tượng thủy văn năm 2010, 2011 trên địa bàn huyện Trà Cú, tỉnh Trà Vinh. Summary of the hydrometeorological situation in Tra Vinh in 2010 and 2011. Hydrometeorological Institute Tra Vinh. Tra Vinh, Vietnam.
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- Jacob, J.; Mehiriz, K. (2012): Elements of a frame of reference for evaluating adaptation to climate change: The RAC-Québec case. Centre Des Recherche et D'Expertise en Evaluation (Research Report).
- Silva Villanueva, P (2011): Learning to ADAPT: monitoring and evaluation approaches in climate change adaptation and disaster risk reduction - challenges, gaps and ways forward. Strengthening Climate Resilience Discussion Paper 9. IDS (Institute of Development Studies). Brighton.
<http://community.eldis.org/.59d49a16/Learning-to-ADAPT.pdf> (accessed: 29 Oct 2012).
- UNFCCC (2010): Synthesis report on efforts undertaken to monitor and evaluate the implementation of adaptation projects, policies and programmes and the costs and effectiveness of completed projects, policies and programmes, and views on lessons learned, good practices, gaps and needs. Nairobi work programme on impacts, vulnerability and adaptation to climate change. Nairobi, Kenya.
- Tra Vinh Economic Zone Authority (2012): Phân khu chức năng khu kinh tế Định An. Functional areas of Định An economic zone. Tra Vinh, Vietnam.
- Turner, B. L.; Kasperson, R. E.; Matson, P. A.; McCarthy, J. J.; Corell, R. W.; Christensen, L. et al. (2003): A framework for vulnerability analysis in sustainability science. In *Proceedings of the National Academy of Sciences* 100 (14): 8074-8079.


**Thank you for your
attention and feedback!**




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Legend

 Analytical components

 Analytical sub-components

 Main influences between sub-components

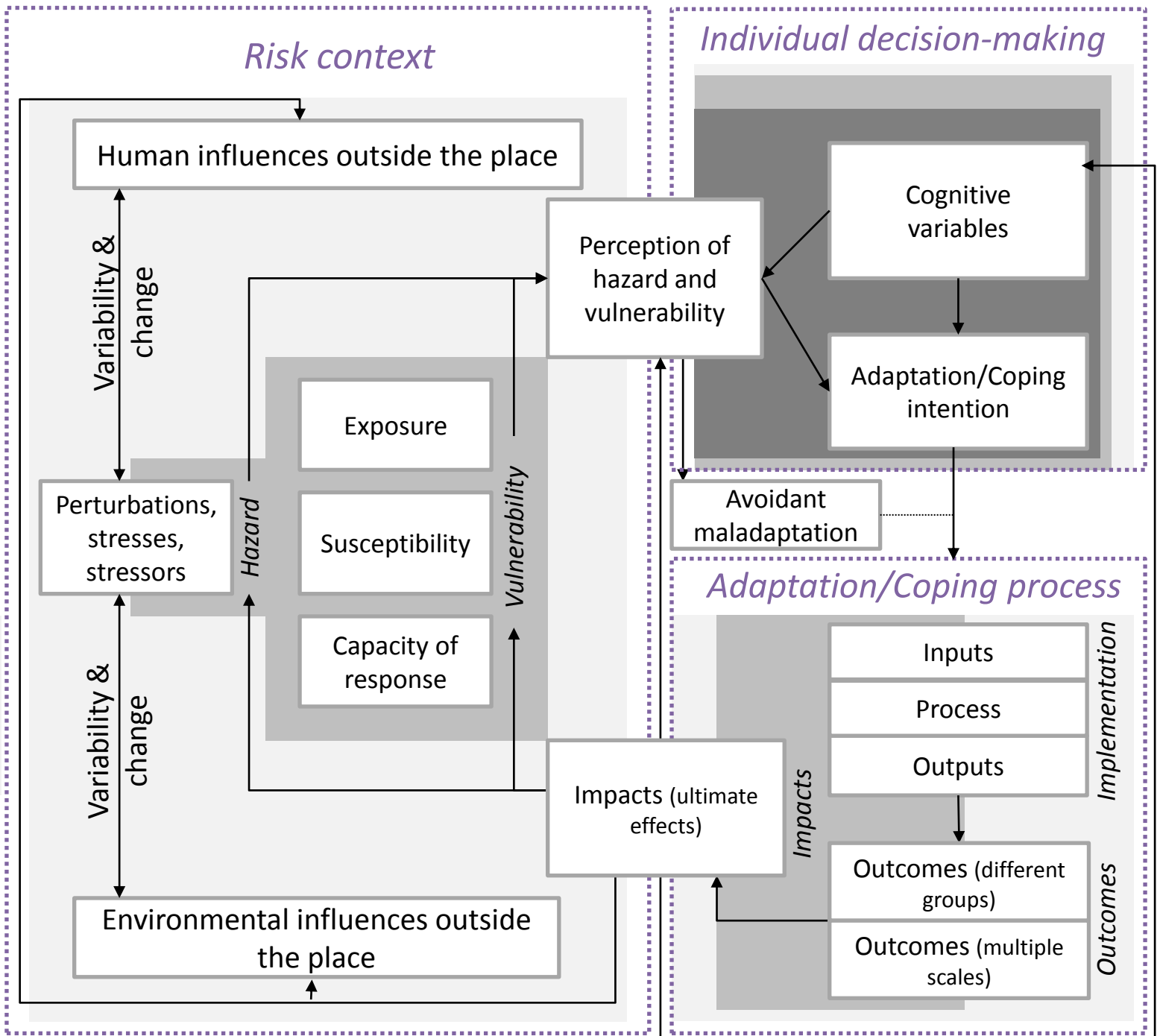
Region/World

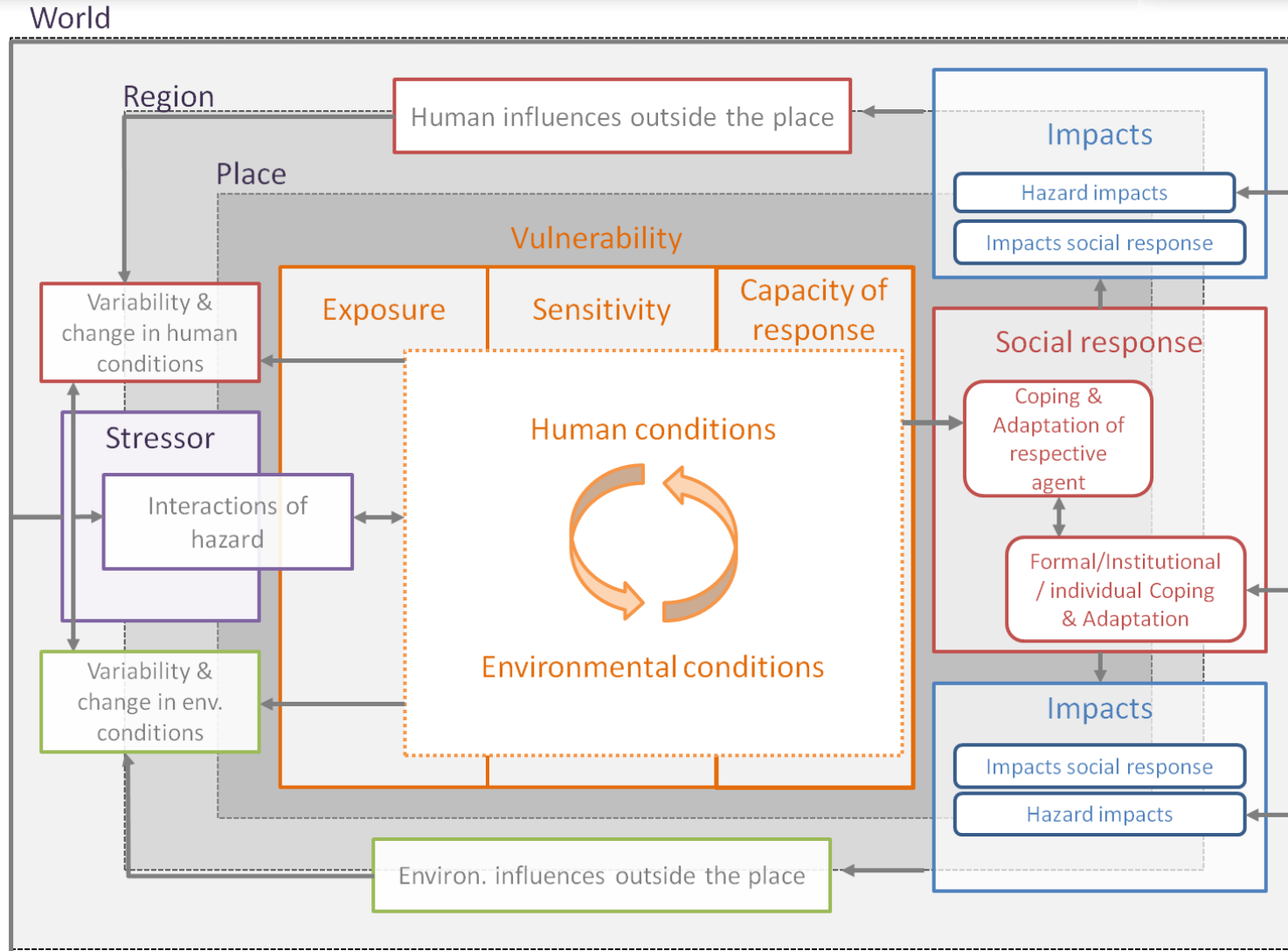
Place

Agent

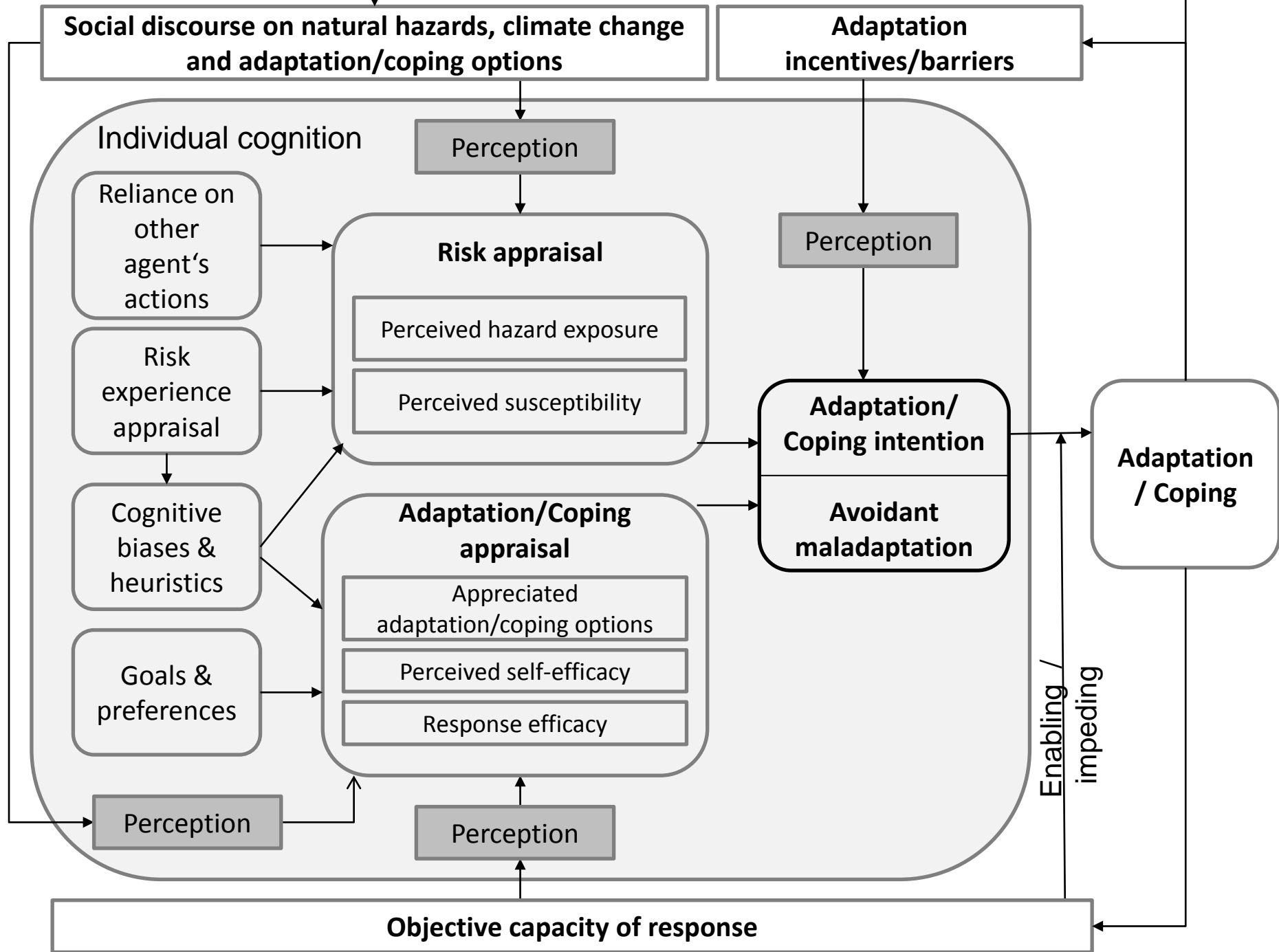
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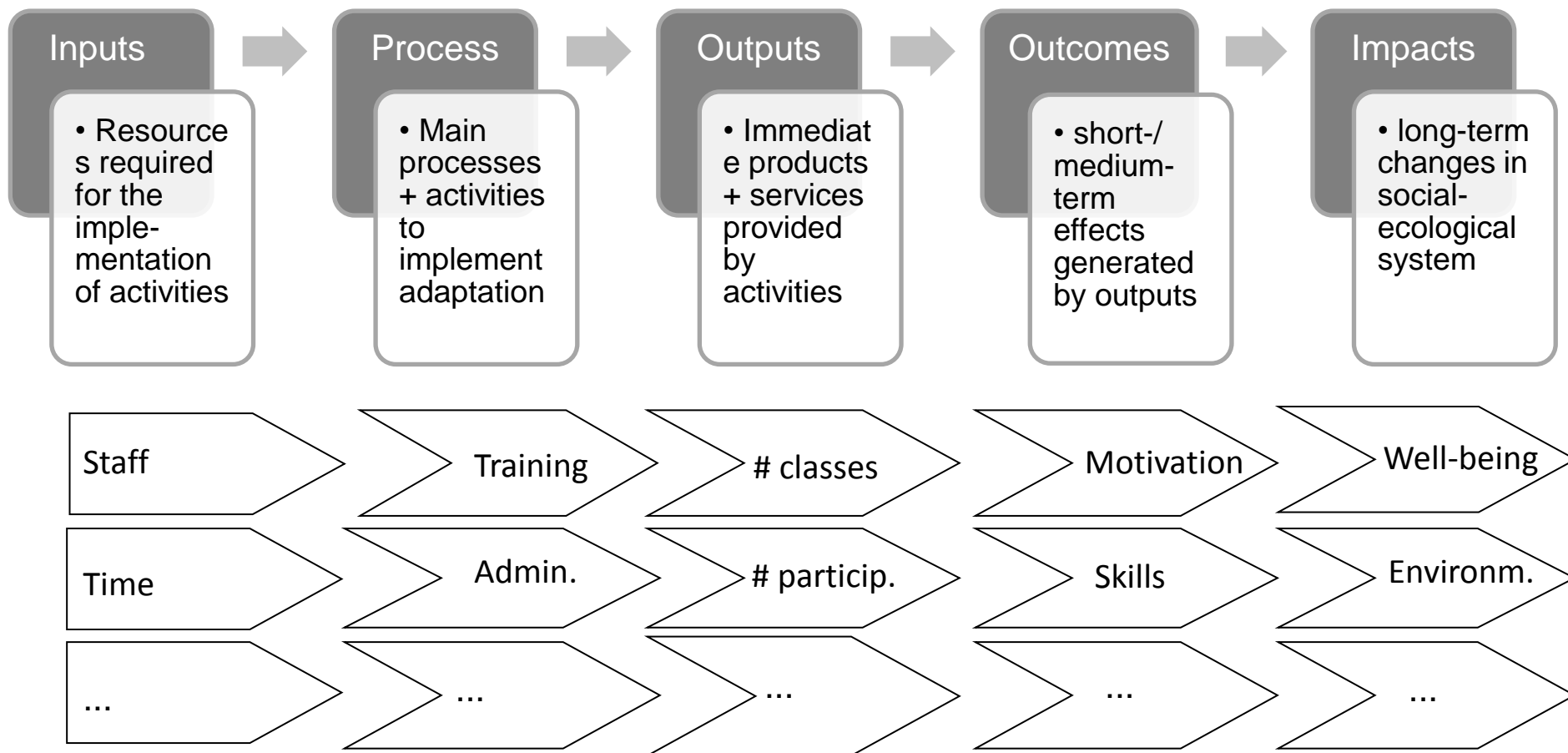
author, based on Turner et al. (2003); Grothmann & Patt (2005); Jacob & Mehriz (2012); UNFCCC (2010)





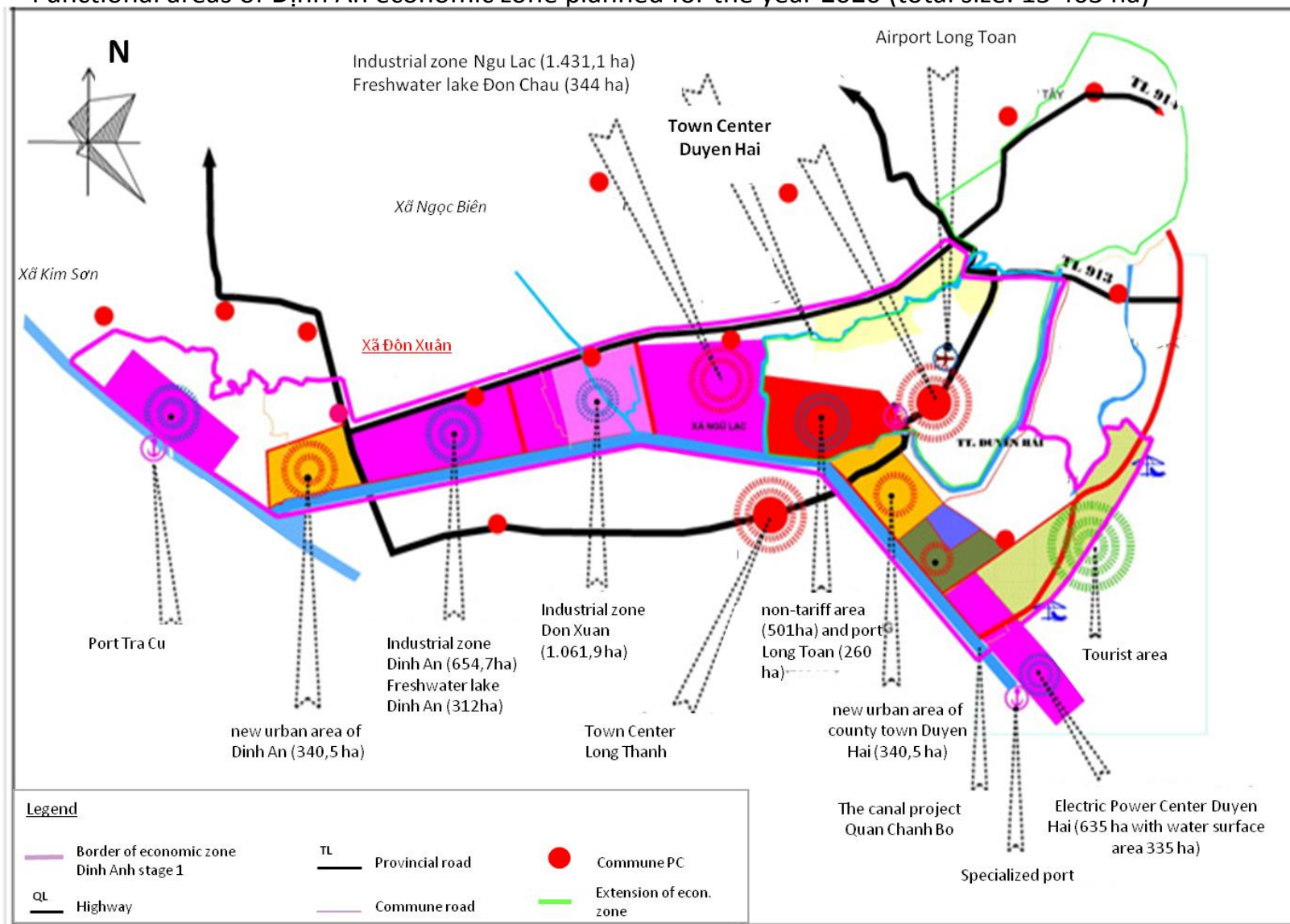
Source: own draft based on {Turner 2003 #890}





Changing risk – Industrial zone plans for the year 2020

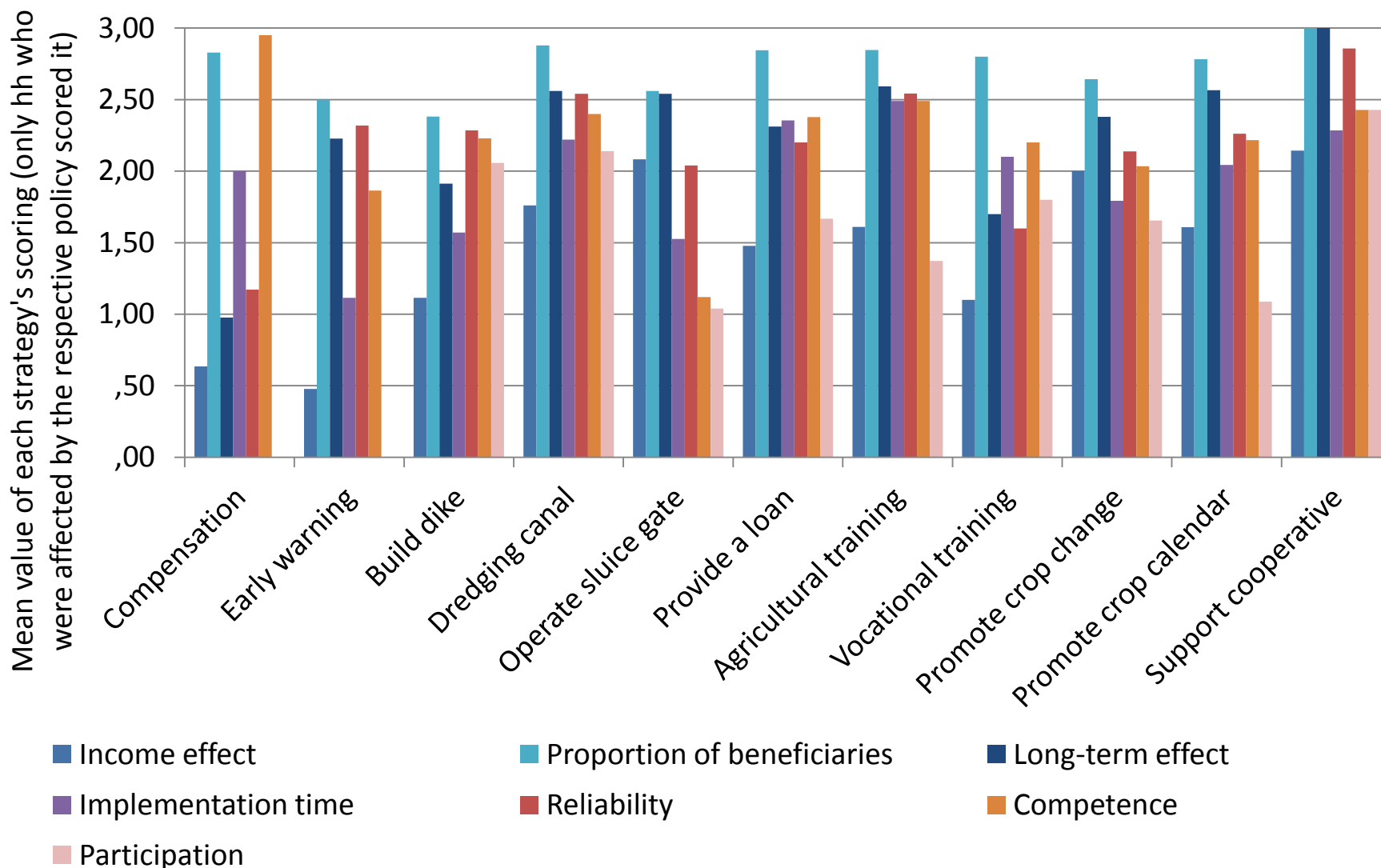
Functional areas of Định An economic zone planned for the year 2020 (total size: 15 403 ha)



Source: translated and complemented draft, data and cartography Tra Vinh Economic Zone Authority (2012)

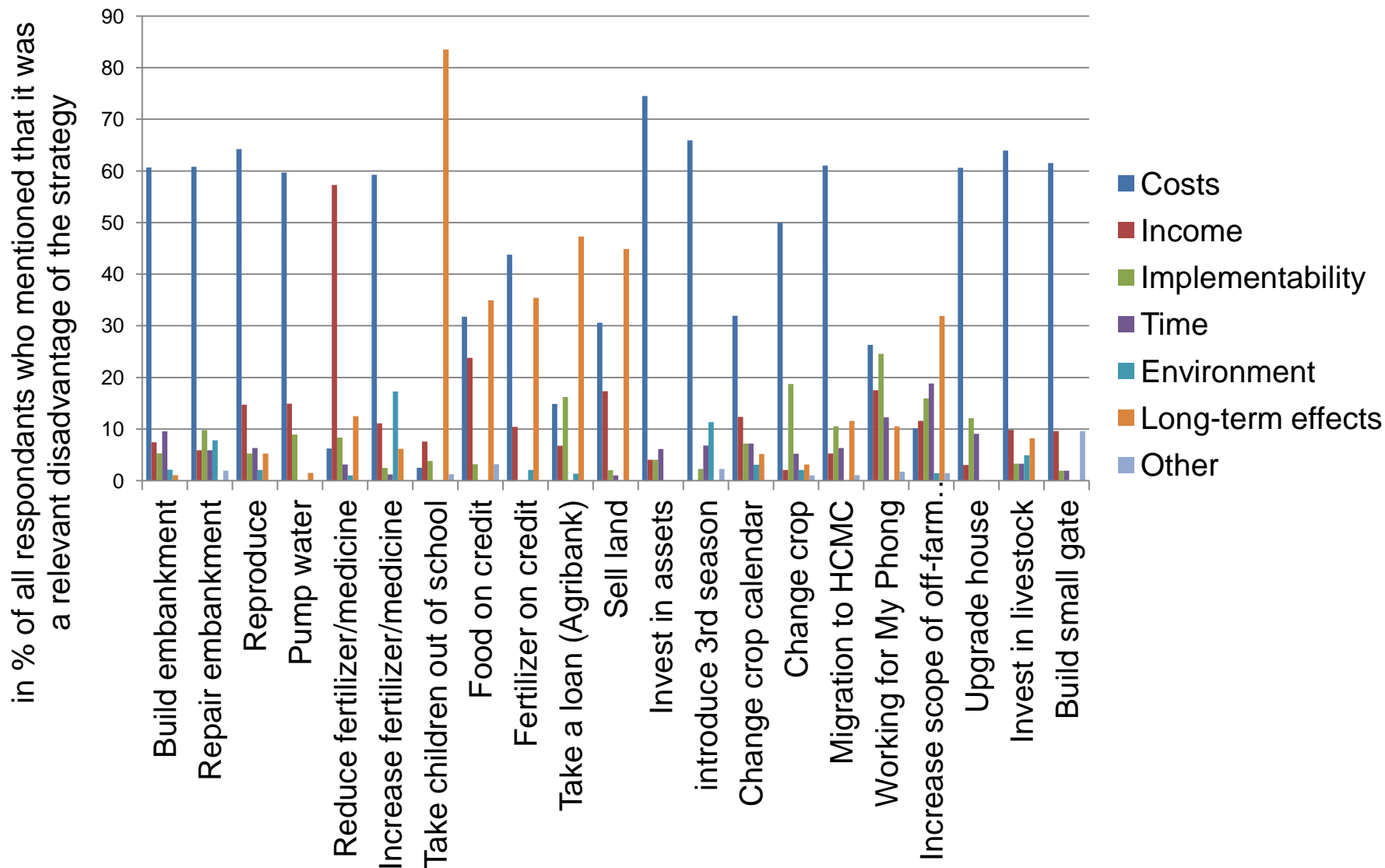
Subjective evaluation of government strategies

Scoring of most important governmental strategies according to selected criteria



Subjective evaluation of household strategies

Figure 14: Most important disadvantages of selected strategy options



Example: Perceived advantages and disadvantages Growing winter-spring rice

“The income returns are high in these seasons”.

“The output prices were high so that we chose to produce another season of rice”.

variable costs:

WS: 1.225.567 VND/cong

... /: 1.561.736 VND/cong

WS: 1.225.567 VND/cong

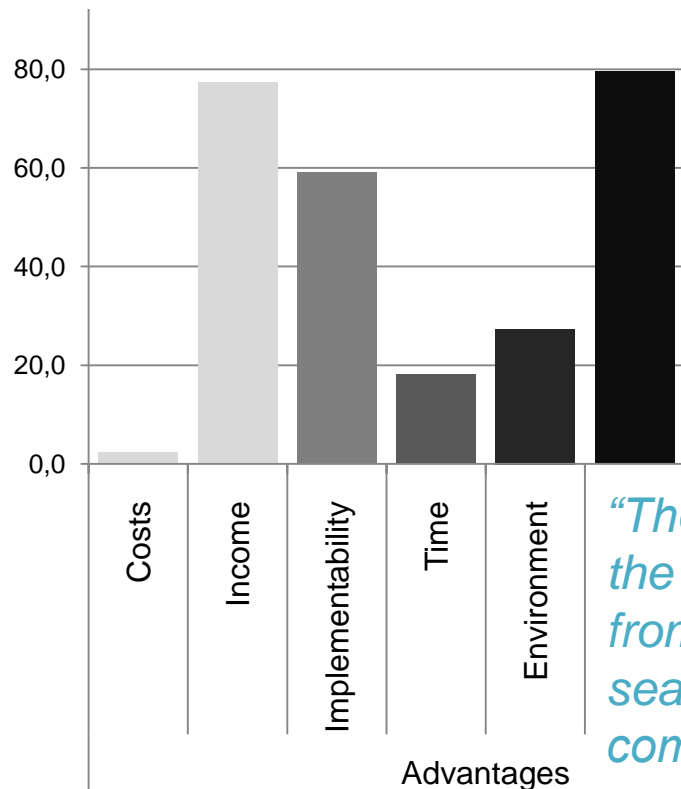
(after on cases!)

„it affects the

environment because the

land is not used”

“The work is harder [than for the other seasons] because of the pumping”.

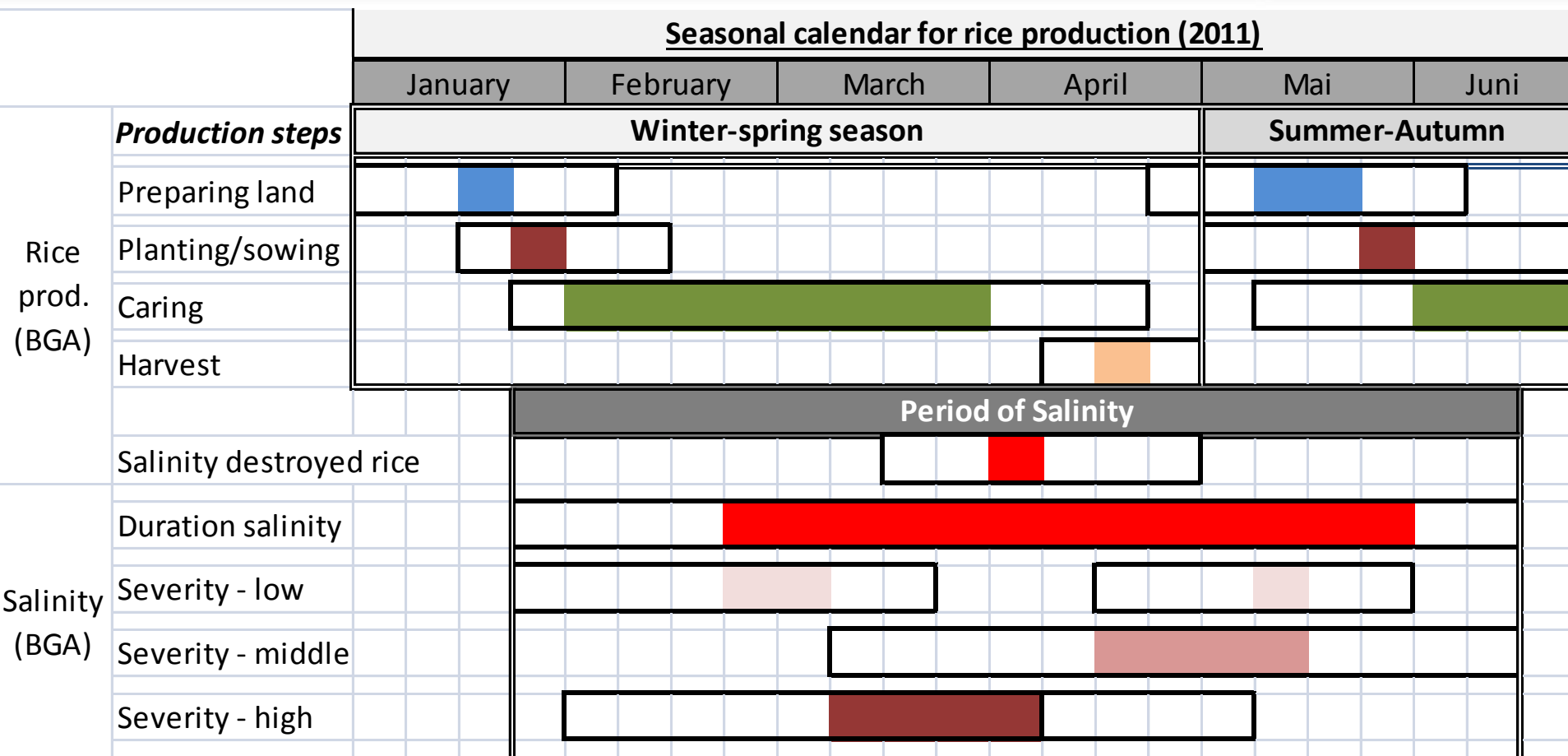


“The costs are high but the increased income from a third rice season would compensate for that”

% of all relevant respondents who mentioned these criteria as relevant (n=98)

Evaluation criteria for household strategies	<i>Scoring of relevant criteria for decision-making (total of 25 points)</i>			
	Households			
	Average	Xoai Rum hamlet	Bau Sau hamlet	Sa Van A hamlet
Sugar cane		Aquaculture	Rice	
Income	10	8	11	12
Costs	7	10	6	5
Environment	1	0	0	4
Food security	0	0	0	0
Implementation time	1	1	0	2
Autonomy/Implementability	1	0	1	2
Flexibility	2	6	0	0
Long-term impact	2	0	5	0
Climate Change proof	0	0	0	0
Risk	1	0	2	0
<i>Total of ascribed points</i>	25	25	25	25
<i>Number of participants</i>	61	13	31	15

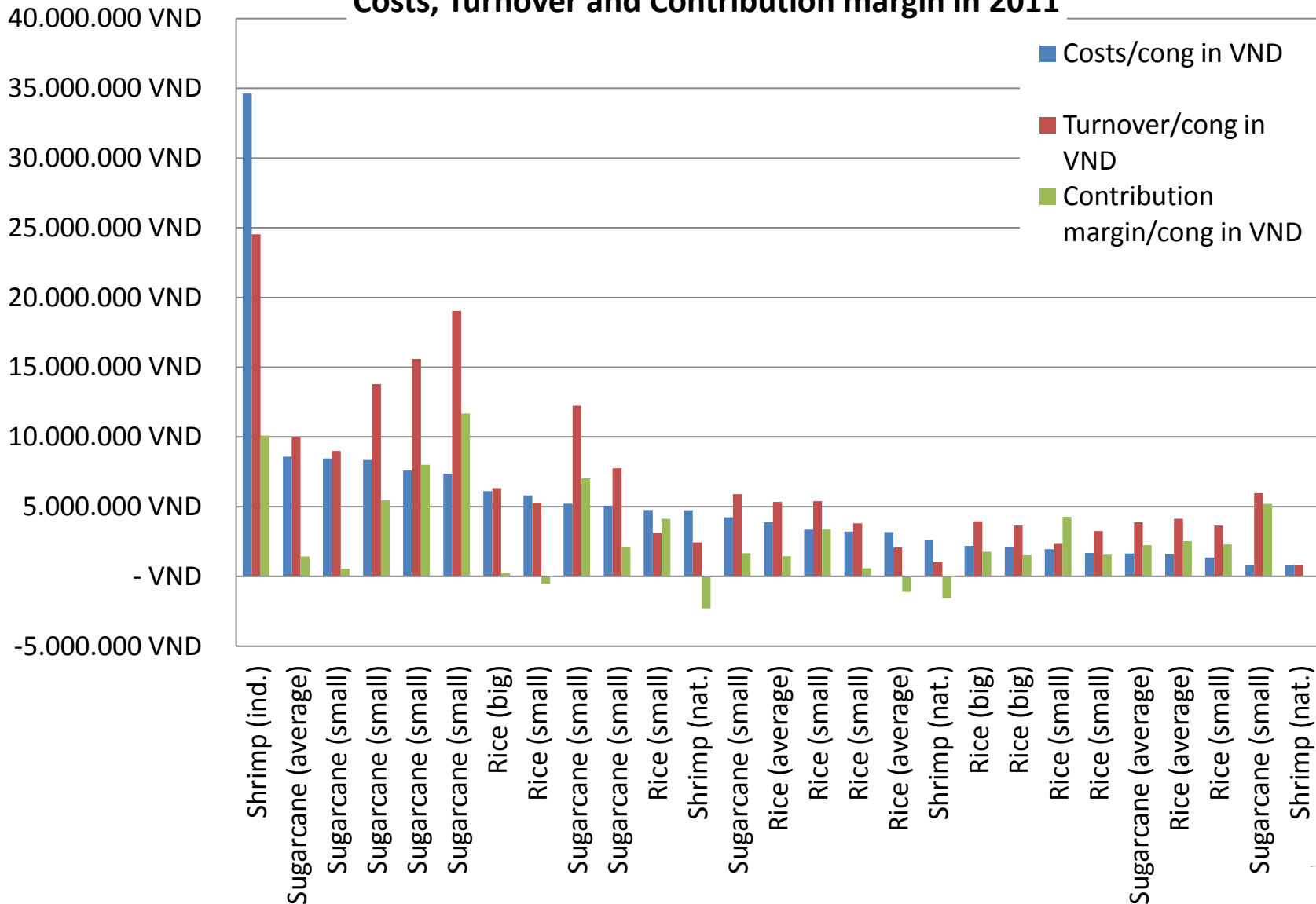
Figure 2: Identification and scoring of relevant evaluation criteria in household decision-making
Source: Group discussions and authority interviews; M. Schwab 2012



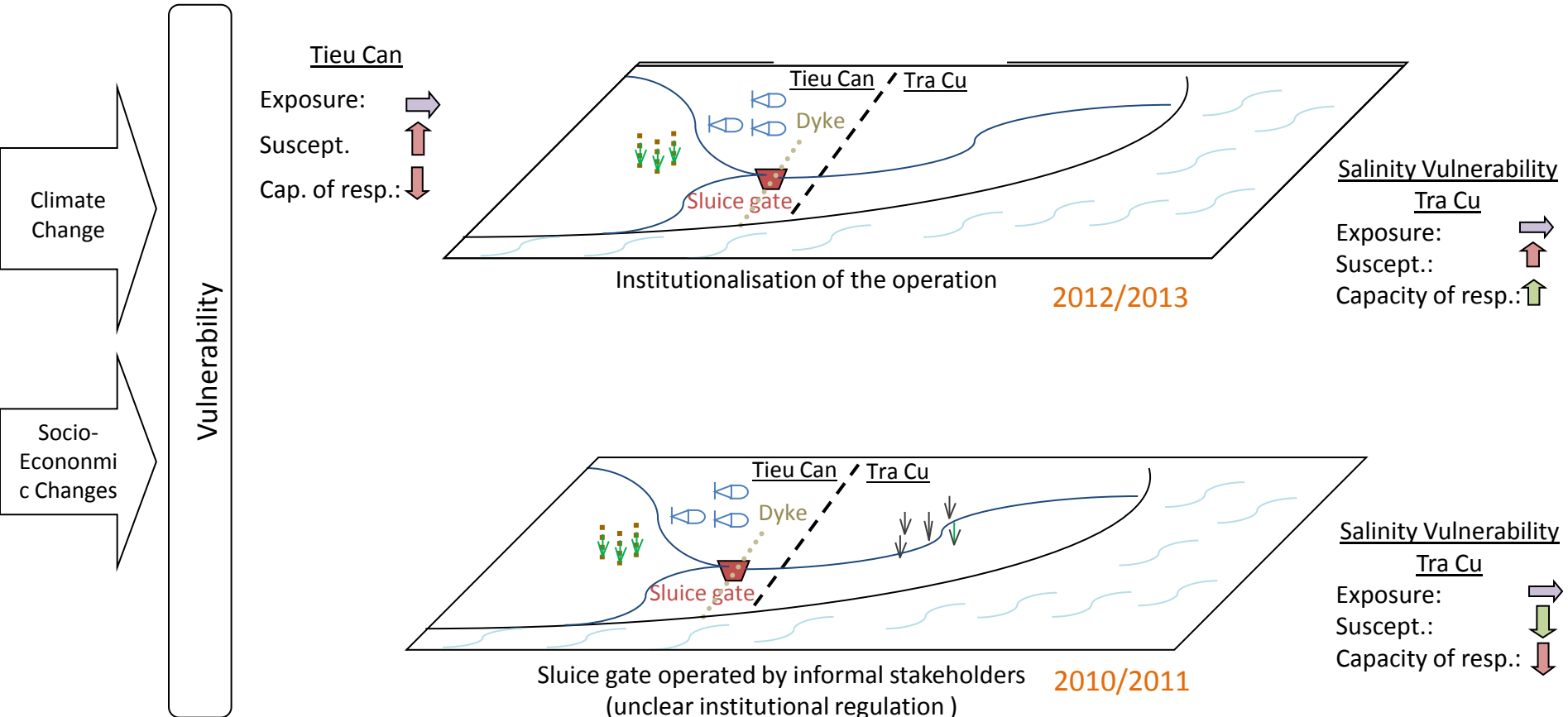
Explanation: The figure describes the timing of the production steps and the occurrence and duration of salinity intrusion for ten households in Ba Giam A (BGA) hamlet (Don Xuan commune). Every field marks one week of the year 2011. The black frames illustrate the period between the earliest beginning and latest ending of a step/phase. The shaded fields show the period between the average beginning and ending of a step/phase.

Contribution margin calculations

Costs, Turnover and Contribution margin in 2011



Institutions, Interconnectivities and the differential distribution of costs and benefits



Stakeholder preferences and priorities

Pairwise comparison	Agricultural training class	Vocational training classes	Loan for production	Upgrade the dyke	Operation of sluice gate
Agricultural training class					
Vocational training classes	<u>223</u> 89				
Loan for production	115 <u>197</u>	99 <u>213</u>			
Upgrade the dyke	93 <u>218</u>	65 <u>247</u>	128 <u>183</u>		
Operation of sluice gate	91 <u>220</u>	81 <u>231</u>	127 <u>183</u>	<u>172</u> 136	